INSTRUCTION MANUAL

SI 672

MAINTENANCE MAN'S PACKAGE

ATLANTIC RESEARCH

A DIVISION OF THE SUSQUEHANNA CORPORATION

TELEPRODUCTS DEPARTMENT

SHIRLEY HIGHWAY AT EDSALL ROAD
ALEXANDRIA, VIRGINIA 22314

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OPERATING INSTRUCTIONS

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GENERAL DESCRIPTION

The Maintenance Man's Package consists of three portable test instruments for complete station and line tests. The instruments are furnished in a convenient fitted carrying case and include

One Distortion Measuring Set of the DMS-3 Series

One Test Message Generator of the TMG-2 or TMG-3 Series

One power supply, the Portable Telegraph Loop Power Supply TPS-1 or the Test Signal Source TSS-1.

This manual contains the general information on the use of the individual instruments in normal test situations. It also outlines the interconnections required for typical situations which require the use of more than one test instrument. Detailed information and operating instructions for each instrument is contained in the Technical Manuals furnished with the Package. General instructions are also attached to the inside cover of the DMS, TMG, and TPS.

I. USE OF THE DISTORTION MEASURING SET DMS-3

For in-service tests on low-impedance circuits (neutral or polar loops), connect the instrument in series with the circuit to be tested using a tip-and-sleeve patchcord between the LOOP INPUT jack and the jack in the circuit under test. If there is no circuit jack, use a cord with tip-and-sleeve plug on one end and alligator clips on the other end. Be prepared to interrupt the circuit continuity before connecting the alligator clips.

For out-of-service testing of neutral circuits, the DMS-3 may be used with the TPS-1 or the TSS-1 (see Procedure V).

For tests on high-impedance circuits (EIA or MIL-STD-188B), connect the instruments in parallel with the circuit to be tested using the red and black POLAR VOLTAGE jacks. Insert a dummy plug in the LOOP INPUT jack to turn on the instrument's internal power supply.

To make distortion measurements, use the following procedure.

a. Set the selector switch and the speed switch on the DMS to the proper positions for the circuit under test. Set the lever switch to SIGS (middle position) and set the TIP switch so that the meter follows the signal pulses. (If the circuit is idle (mark-hold) proper TIP switch setting will cause the meter to read a high number to the right of zero.)

b. Set the lever switch to MAX DSTN. Read the measured distortion on the instrument meter.

c. If the distortion measured is within the allowable limit, no further testing is necessary. If the distortion measured is outside the limit (or further analysis of transmission is desired), set the lever switch to BIAS. Read the average bias distortion on the instrument meter.

NOTE

Bias measurements should be made on miscellaneous traffic or on selected repetitive signals, such as "RY" in 5- or 6-level code, which contain approximately equal numbers of unit mark and unit space pulses. Pulses longer than unit length are not measured by the instrument. Signals which do not contain both unit mark and space pulses may yield erroneous bias distortion readings.

d. Subtract the measured bias distortion from the measured maximum distortion to determine the amount of distortion other than bias, e.g. fortuitous distortion.

II. USE OF THE TEST MESSAGE GENERATOR TMG-2 OR TMG-3

For transmission on low-impedance neutral loops, connect the TMG in series with a powered loop using a standard tip-sleeve patchcord between the circuit under test and the tip-sleeve jack located on the side of the TMG. Loop current must not exceed 100 milliamperes. If the circuit to be tested is unpowered, the TMG may be used in conjunction with the TSS-1 or TPS-1 (see Procedure VI).

For polar transmission, the TMG must be used in conjunction with the TSS-1 (see Procedure VI).

For tranmission on high-impedance circuits (EIA or MIL-STD-188B), the TMG-3 may be used as a signal source, or the TMG-2 may be used in conjunction with the TSS-1 (see Procedure VI). Disconnect the machine from its normal signal source, and connect the TMG-3 to the circuit under test using the BNC connector located on the side of the instrument. Center conductor of the BNC connector is negative for the marking condition and should be connected to the hot side of EIA circuits and the ground side of MIL-STD-188B circuits.

To test and adjust a teleprinter for maximum distortion tolerance, use the following procedure.

a. Refer to the lid instructions and set the MODE switch to obtain the proper speed and code level. Set the FUNCTION switch to SWITCHED BIAS. Set the % DSTN switch to 0.

b. Program the CHARACTER switches for "RY" (5- or 6-level) or a combination of letters having approximately equal numbers of unit length mark and space pulses. (Code charts appear in the lid instructions.)

NOTE

The start and stop pulses for the two characters are programmed automatically by the setting of the MODE switch. The CHARACTER switches should be programmed only for the information bits, from left to right. The positions of the unneeded switches in 5-, 6-, or 7-level codes are immaterial.

c. Move the range finder on the teleprinter to locate the extreme upper and extreme lower points at which the teleprinter will produce only two lines of error-free copy.

d. Set the range finder at the midpoint of the two extremes.

e. Move the % DSTN switch until the machine starts to print errors.

f. Set the % DSTN switch at 5% less than the error-producing position.

g. Again move the teleprinter range finder to locate the upper and lower limits of error-free copy. Set and tighten the range finder at the midpoint of these two extremes. This is the optimum setting for maximum distortion tolerance.

h. Again move the % DSTN switch until the machine starts to print errors. If the tolerance of the machine is still outside the prescribed limits, mechanical adjustment of the machine should be made in accordance with the teleprinter manual.

To test a line facility, connect the TMG to the facility and transmit to the distant terminal (with the MODE switch positioned for the proper speed and code level). Undistorted reversals may be transmitted by setting the FUNCTION switch to REV. Distorted or undistorted characters may be transmitted by proper setting of the FUNCTION and % DSTN switches.

To check single-character tranmission or to check a polling function requires a TMG-3.

a. Set the MODE, FUNCTION, and % DSTN switches to produce the desired conditions.

b. Set the STEPPED/CONT. switch to STEPPED. One character will be transmitted each time one of the STEPPED pushbuttons is pushed.

III. USE OF THE PORTABLE TELEGRAPH LOOP POWER SUPPLY TPS-1

The TPS-1 provides a regulated current source for unpowered neutral loops requiring 20 to 60 milliamperes nominal current. (The instrument is adjustable from 18 to 70 milliamperes.) Detailed operation instructions are given in the lid of the instrument.

With the LOOP switch set to EXT, the four jacks may be used to connect equipment in series with an externally powered loop. The instrument provides no current regulation for the externally powered loop.

IV. USE OF THE TEST SIGNAL SOURCE TSS-1

When keyed by a dry-contact (or low-voltage) signal source, the TSS-1 provides regulated polar or neutral output signals for unpowered loops and low-level polar voltage signals (EIA or MIL-STD-188B) at controlled voltage.

The TSS-1 also may be used as a regulated current source for unpowered neutral loops (with signal keyeing originating in the external loop). Disconnect any inputs from the instrument. Set the LOOP switch to NEUTRAL and the FUNCTION switch to MARK HOLD. The loop connected into the LOOP jacks will be provided regulated current as indicated by the instrument meter and controlled by the OUTPUT ADJUST potentiometer.

V. USE OF THE DMS-3 AND THE TPS-1 OR TSS-1 FOR DISTORTION MEASUREMENTS ON AN OUT-OF-SERVICE BASIS

To measure neutral signals from an out-of-service teleprinter (or line facility), use the following procedure.

a. Remove the machine from its normal line without causing interruption to the line.

b. Patch it to a looping jack of the TPS-1 or the TSS-1 (set for NEUTRAL MARK HOLD output).

c. Patch the DMS-3 to another looping jack of the power supply.

d. Follow the procedure for distortion measurements (see Procedure I).

VI. USE OF THE TMG AND THE TPS-1 OR TSS-1 FOR OUT-OF-SERVICE TELEPRINTER (OR OTHER EQUIPMENT) TESTING.

To test a neutral teleprinter through an unpowered loop (or direct patch), patch the TMG and the Teleprinter into the looping jacks of a TPS-1 or a TSS-1 (set for NEUTRAL MARK HOLD output) and follow the procedure for testing and adjusting a teleprinter (see Procedure II).

To test a polar teleprinter (with a TMG and TSS-1), use the following procedure.

a. Disconnect the teleprinter from its signal batteries.

b. Connect a TMG-2 or TMG-3 to the INPUTS CONTACT jack of the TSS-1.

c. Set the TSS-1 LOOP switch to EIA/POLAR and plug the teleprinter into a LOOP output jack.

d. Follow the procedure for testing and adjusting a teleprinter (see Procedure II).

To test an EIA computer or business machine, use the TMG-3 directly coupled to the machine (see Procedure II), or use the TMG-2 and the TSS-1 and the following procedure.

a. Disconnect the machine from its normal signal source.

b. Connect a TMG-2 to the INPUTS CONTACT jack of the TSS-1.

c. Set the TSS-1 LOOP switch to EIA/POLAR and plug the machine into the EIA OUT jacks.

d. Follow the normal testing procedure for the machine.